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PARLIAMENTARY SESSION 1924

SELECT STANDING COMMITTEE

ON

# AGRICULTURE AND COLONIZATION

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ADDRESS BY

Mr. H. T. GÜSSOW, Dominion Botanist

ON

SEED POTATO CERTIFICATION

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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HOUSE OF COMMONS, ROOM 429,
TUESDAY, May 13, 1924.

The Select Standing Committee on Agriculture and Colonization met at 10.30 a.m.

In the unavoidable absence of the Chairman, Mr. Kay, Mr. Robinson was asked to take the Chair.

Mr. H. T. Güssow, Dominion Botanist, was called and addressed the Committee as follows: Mr. Chairman; I wish to express to you my appreciation for having been asked to appear before the Committee to-day to give you some idea of the work which we are doing on potato certification. I found it advisable because of the importance of the subject to put my thought and ideas on paper, and if you will allow me I will read these to you.

The system of certification of seed potatoes as carried on to-day under the Dominion Department of Agriculture by the Division of Botany, Experimental Farms, has very gradually attained its present scope and standard.

The origin of the inspection service is of interest. When in 1909 the Dominion Botanist discovered that Potato Canker or Wart disease, a disease originating in 1896 in Hungary, but which had spread gradually from country to country until at the present time but few European countries are free from it, had found its way across the Atlantic and was fairly rampant in Newfoundland, precautionary measures to safeguard the potato industry of Canada became very necessary. To begin with, owing to the fact that potatoes were freely imported into Canada from European countries, it was found necessary to prohibit the further unrestricted importation into Canada.

This action, approved by Parliament and provided for under the Destructive Insect and Pest Act, was followed by a Dominion-wide campaign calling attention to the dangers that might result from the prevalence of this disease in Canada and inviting the co-operation of all farmers to aid the Department in determining whether the disease had previously gained entrance. Most of you may remember the coloured poster that was prepared and widely distributed at that early time—almost the first step in the organization of the plant pathological service of the Dominion of Canada—and of which poster the retiring president of the British Mycological Society expressed himself in his presidential address as follows:—

" In Canada they do not wait for a dangerous pest to arrive and make itself unpleasantly evident before they begin writing about it, but if there be a possibility that such may come, a warning circular is sent out broadcast, which contains a most excellent coloured illustration and references to a bulletin in which detailed particulars may be read. One stalwart young warrior—(*relating to a conversation had during the recent war*)—told me that Circular No. 3 (a warning one which concerns the Potato Canker) is displayed in post offices in remote districts as well as in provincial towns, and he was proud to mention a certain village with a population of thirty-two which had not been forgotten by the Government."

As a result of this campagin we were assured that potato canker had not then found its way into the Dominion, but a lookout has been continued which is by no means relaxed even to-day. This is a most important precaution, since isolated cases of this disease were discovered recently in the United States almost ten years after the prohibition of the importation of potatoes from European countries went into effect in that country.

The United States prohibited the importation of potatoes from Europe one year later than Canada did, and ten years after the total prohibition of importation of potatoes from Europe they found traces of this disease in the United States.

The distribution of this poster had, however, one remarkable result; indeed, it may be regarded as the origin of our present potato certification. Printed in the French language the term by which this disease is known in France, viz. " Gale noire " was used. Gale noire means black scab, and some of the interested French farmers of Canada sent into our laboratories specimens of a new form of potato scab that had not hitherto been observed on the Continent of America.

Attention to the presence of this new form of scab, with which I have been familiar for years in Europe, where it is widely prevalent, was called in the usual way in scientific literature, with the remarkable and unexpected result that the United States authorities, equally anxious, no doubt, to safeguard their own industries from new diseases, placed an embargo against the entire Dominion of Canada as far as potatoes were concerned. This action illustrates on the one hand the importance with which the United States regarded the question of plant diseases, while on the other hand it showed plainly that scientific discoveries of this kind are not always appreciated, since many of you representing potato growing communities will remember the outcry that was raised against the indiscreet discoverer of new diseases, which very nearly put an end to his scientific career in Canada. It is, however, an ill wind that blows nobody any good. This discovery led to the organization of a careful and systematic study of the diseases of the potato, and when some time later the United States authorities found that the same disease was widely prevalent in certain states of the Union, the embargo was modified and potatoes were admitted again subject to almost impossible conditions, viz. the certification of all Canadian potatoes intended for export to the United States as regards freedom from all diseases. This was later modified and potatoes reasonably free from diseases were admitted, until finally the work done in Canada among potatoes once more gained the confidence of the United States' authorities.

During these years there were found a number of potato diseases that seriously reduced the yield of potatoes, and that were most widely distributed throughout the continent of America. I refer to the Mosaic and Leaf Roll diseases of potatoes.

I have brought two specimens this morning which I thought might be of interest to you. These are growths made by one single eye of a diseased potato and of a sound potato. Both were planted at the same time. The one is the growth of a single eye of a mosaic diseased potato, and the other of a normal, healthy potato.

Neither of these diseases can be recognized from the seed tuber. They are constitutional troubles inherent in the tuber, which appears perfectly sound to all intent and purposes. The former is noticed in the growing potato by a peculiar mottling of the leaves, and may reduce the yield to some fifty per cent. It is transferred solely by use of potatoes from an infected field, each infected plant giving rise to infected tubers. The cause of the disease is unknown. Every year more plants are found that are subject to this disease. Tobacco, corn, turnips, clovers, cucumbers and some hundreds of other wild and cultivated plants, including raspberries, etc., are now known to become infected. In potato fields it has been found that the disease is spread from plant to plant mainly by insect transmission, notable through a green fly or potato aphis *(Macrosyphum solanifolii* Ashmead). Flea beetles and the Colorado beetle, however, are apparently unimportant as disseminating agents.

In view of the fact that the potato plant affords no shelter to this aphis in winter, a search was made by an entomologist of the State of Maine, Dr. Edith Patch, for the winter quarters of this aphis, when it was discovered that

the primary food plant is the common wild rose, on which overwintering occurs. It is therefore quite true that the rose bush should be removed as a first aid measure to the control of mosaic, and especially so where certified potatoes are produced. Secondly, there should follow methods directed towards the destruction of aphids in the potato fields. This work referred to has been confirmed by observations made by this author in the Province of New Brunswick, while research work is at present carried out by the botanical staff in co-operation with the Entomological Branch in Quebec, New Brunswick and British Columbia. In our experiments we have determined that the mosaic disease may reduce the yield by fifty and more per cent. Potato fields with 80-100 per cent mosaic are by no means rare, and the Green Mountain variety is especially susceptible to it. Our problem remains to educate farmers everywhere to discontinue the use of seed potatoes that have not passed inspection. It is interesting to relate here the experience which we have had on several occasions when at potato fairs seed potatoes were awarded the first prize by judges who were unaware of the fact that they resulted from fields showing eighty per cent mosaic. It would seem most desirable to exercise far greater precautions in awarding prizes at such fairs, to potatoes the record of which is unknown. Recently exhibits of certified seeds were prepared, and any lot winning first prize under such circumstances is truly a most desirable kind for seed. What has been said of Mosaic disease is equally true of Leaf Roll, with minor modifications. Leaf Roll is another constitutional disease equally responsible for reduction of yields and similarly transmitted. It is especially widespread among the Irish Cobbler group and most prevalent among the Garnet Chili potatoes grown in Nova Scotia for export to Bermuda. It may here be stated that the Bermuda authorities refuse the entry of potatoes from Nova Scotia unless they have passed our inspection and have been duly certified.

The cause of leaf roll is unknown. It is known of this disease as well as of mosaic that the juices of the plant contain the contagium. We know that these diseases are disseminated by the tubers, transmitted by sucking insects, principally aphids, and we know definite measures for the control.

Roguing the fields, that is, the removal as soon as recognized of all affected plants, providing their number does not exceed say five per cent, has certainly given good results, but great care is necessary, for if previous to the removal of infected plants, plant lice were abundant, you might just as well refrain from taking the trouble, because the aphids will have spread these troubles to other plants. That is one of the most important points that we have learned from practical experience.

If one goes in for seed potato growing, start with the best certified seed, see that rose bushes are removed from anywhere near your field, control the aphis at once, remove any affected plant you can see, and keep your field away from nearby fields not looked after in this way. So you will realize that quite a number of factors have to be observed by the grower of certified seed. In consequence, we have always found that the half-interested grower soon becomes tired and drops out, while the interested man reaps the benefit.

I have dealt in the foregoing principally with two very important diseases, which were found on our inspecting fields and conditions in accordance with the conditions imposed upon us by the United States certification of shipments. At first we did not issue any certificates at all. We endeavoured to interest farmers in the elimination of the causes of low yields, but when we found nearly everywhere that people became interested, and mentioned when disposing of their crops that their potaties were government inspected, we soon were "up against it," to use a colloquial expression. The purchasers wrote us as follows: "You have inspected these potatoes, and on your inspection I bought them," or "I have thirty per cent foreign varieties in my field now," or "They were a very

scabby lot," or "They are the worst potatoes we ever planted." And strange enough most of these complaints were well-founded. We had indeed inspected the crops as had been claimed, but the seller did not tell the purchaser that we had condemned them as unfit for seed.

So you will understand that the issuing of some kind of certificate became desirable in order to protect ourselves as much as those men who took every care, from the more unscrupulous elements. Such a certificate, of course, should cover as many of the essentials as possible, and not only cover them, but standardize these requirements to render our services as uniform as possible.

We have found that radical changes are most unwelcome, especially where government services are concerned, and therefore undesirable, but we also have found, from experience, that most commodities will standardize themselves quite satisfactorily; only very little common sense requires to be applied.

Now the fundamental essential to cover as far as we were concerned then and now is freedom from diseases conveyed by the seed tuber. It therefore became necessary to enumerate these, that were important in this regard. We had found that there exist diseases that could not be determined from an inspection of the tuber, viz. Mosaic and Leaf Roll, already dealt with. In consequence bin or cellar inspection alone was of no use. Inspection of the growing plants was essential. The following diseases belong to the group to be determined by field inspection: Mosaic, Leaf Roll, Black Leg and Wilt diseases.

While such determination in the field was made, it was obvious that at a suitable time foreign varieties could be readily recognized, as well as the trueness to name of the variety under cultivation. The best time to do this is at blossoming time, and up to the present we have commenced this work at that time. I may here mention again the importance of experience and scientific research as applied to this phase of agriculture. We have met occasionally with the perplexing problem that some of our certified seed when planted produced an unusual amount of mosaic and leaf roll, quite out of proportion to the original amount present. This caused complaints, and when looking carefully into suspicious cases at another time, by having inspection controlled and repeated by experienced district inspectors, we were unable to account for this, and arrived at the same conclusion reached by other inspection services, viz., that under certain conditions—climatic principally—mosaic was masked and could not be recognized. Fortunately, the discovery that sucking insects conveyed this disease has solved this difficulty. Whereas in former years the first inspection was made at blossoming time—at a time when the potato plants were quite husky in size—we now propose to commence inspection as early as possible, since it was recognized that aphids were no doubt responsible for the development of mosaic out of proportion to our inspection records. Aphids begin work at a very early stage of growth in potatoes, and if a field contained not more than two per cent mosaic or leaf roll plants determined at blossoming time, these aphids had been at work for some four weeks and more and transmitted the diseases to many other plants without showing any sign of them that season. This change of system will materially improve the value of the certificate. The control of the potato aphis at the same time constitutes a very important problem for the entomologists. I am referring to these problems so that you may realize that important lessons may be learned from careful research. Wtihout fundamental research, progress of agriculture will be slow and most uncertain.

After having dealt with the question of diseases noticeable only in the growing plant, we had next to determine what reasonable quantity might be allowed or what standards should be adopted in determining the quality of the seed.

In the early years we had to be considerably more lenient, otherwise no interest would have been taken in this important work. Gradually the

standards in use at the present time established themselves, and as far as field inspection is concerned the following standards now prevail:

| | |
|---|---|
| Blackleg | 3 per cent |
| Leaf Roll (Curly Dwarf, etc.) | 2 " " |
| Mosaic | 2 " " |
| Wilts | 3 " " |
| Foreign | 1 " " |

Providing that in no case shall a total of more than 6 per cent be allowed.

When field inspection is being performed our inspectors are instructed to perform these in the presence, if possible, of the owner of the field. If the field is showing up well, that is, comes up to our standards, or if a slightly higher percentage of diseases or foreign varieties is present, our inspectors request the roguing or removal of diseased or foreign plants, demonstrating where necessary the manner in which this must be done. A record is kept of the findings, and one later inspection is made to ascertain whether the necessary roguing has been done satisfactorily, followed under special circumstances by a third inspection.

Formerly the grower was given a copy of our report, but we have found that this was used by many growers as evidence of the quality of their potatoes and they disposed of their crop on the strength of this preliminary copy of our report. This practice has caused and is causing us very great difficulties. You will quite realize that while the crop may be passable as regards diseases in the field, the tubers may show excessive amounts of bacterial rots, late blight, dry rot, scab and Rhizoctonia. In consequence of this practice complaints have reached us many a time that our potato inspection proved of no value, since purchasers in the United States complained of receiving scabby and otherwise diseased tubers. This practice must be condemned as contrary to the best interests of the seed potato industry of the country. Our services as yet are without cost to the farmer, and if he desires to dispose of his crop he has only to request us to perform tuber inspection as soon as he is ready. The farmers who follow the practice of selling from the field on our reports—which are not certificates—may become responsible for the complete loss of the trade with the United States. The attitude of the United States' authorities in this regard is manifest by an order which was actually issued on January 7, 1923, by the Federal Horticultural Board of the United States, with regard to the importation into the United States of Canadian potatoes, this order being as follows:—

> " Potatoes grown in the Dominion of Canada and Bermuda may be imported into the United States without permit when accompanied by a certificate issued by a duly authorized officer of the country concerned, indicating the district or locality where grown and apparent freedom from injurious potato diseases and insect pests. Such importations shall be subject to such inspection on arrival as may be required by the United States Department of Agriculture."

This order was scheduled to come into force on February 1, 1923, but on the urgent representation of the Minister of Agriculture, who instructed the Dominion Botanist to proceed to Washington and state the case for the Dominion before the Federal Horticultural Board, it was subsequently withdrawn, and on February 13 the following was issued:—

> " Notice is hereby given of the withdrawal of Amendment No. 2 revising the paragraph governing the entry of potatoes into the United States from Canada and Bermuda.....The withdrawal of this amendment leaves without restriction the entry of potatoes from Canada and Bermuda other than such inspections as shall be deemed to be necessary from time to time to determine the freedom of such imports from injurious diseases and insect pests."

It should be borne in mind that there is no doubt Canadian potatoes are very closely watched by the United States authorities; therefore Canadian growers and shippers should take notice that any laxity in observing the standards of our inspection service may result in restrictions that would practically amount to an embargo. This is an exceedingly important warning, and it is hoped that it will be heeded, especially by those men who clamour for a more lenient standard, or who will persist in disposing of their potatoes before certificates are issued. This is especially dangerous when potatoes are exported to the United States. And if ever at any time such results should materialize, let it be understood that the inspection service cannot be blamed.

From this year on we shall not issue any report to any grower of seed potatoes until our inspection is completed. I am sure you will agree that this is the only course open to us, seeing how seriously the entire potato trade of the Dominion may be jeopardized by the action of ever so few but over-zealous growers.

There must be reason in our methods, and we are always most eager to conform to the requirements of the trade; if our inspection service seriously handicaps trade—it has to be reformed accordingly, but we cannot sacrifice the very purposes and aims of our service. I will later deal with the actual benefits derived from our service. Let me now briefly deal with the tuber inspection and our standards in regard to this.

Obviously diseases affecting the tubers again come foremost. The ideal seed potato should be free from all diseases and blemishes, should be true to name, type, and yield well. That surely is a most reasonable aim, but we must take into consideration the conditions under which such can be produced to a commercial extent, and under—naturally—improved methods of farming. This is essential.

Our tuber standards are at present as follows:—

| | |
|---|---|
| Bacterial Rot or Wilt | 2 per cent |
| Late Blight and Dry Rot | 3 " " |
| Common Scab and Rhizoctonia—severe | 5 " " |
| Powdery Scab | 1 " " |
| Foreign | 1 " " |

Providing that in no case shall a total of more than 10 per cent be allowed.

Not more than two per cent of the tubers shall be off type, or damaged by sunburn, cuts, cracks, bruises, insects, etc.

Not more than five per cent by weight of the tubers shall be below three ounces or above twelve ounces.

You will note that we do not allow more than two per cent of tubers off type, by which is meant the peculiar tapering of naturally round varieties or flattening of normally cylindrical varieties, etc. The question of sunburn, cuts, bruises, etc., is not of much importance. On the point of grading for size, however, I wish to say a few words.

We do not permit more than five per cent by weight of tubers below three ounces or above twelve ounces. On this point we have had a number of representations made to us. Some growers are emphatic that we should allow almost any sized potato; others again favour the strict adherence to our present grading. I must confess that grading according to size of the seed tuber is a minor factor as far as the plant pathological service is concerned. A smaller tuber or a larger tuber may be just as useful if coming from an otherwise sound strain, but I desire to point out that especially in the Irish Cobbler group a large potato is usually hollow in the centre, at any rate, frequently so, and purchasers prefer, of course, a potato free from such blemish, which often gives rise to decay of the set. In Green Mountains we may stretch a point, but on cutting large tubers for seed there is a lot of waste for which the purchaser has to pay the same price as for a useful set.

As far as the smaller sizes are concerned, if we permitted a smaller size, we would find in practice a good number below the authorized size. For this reason our inspectors are specially instructed to use their common sense in grading certified seed. We wish to avoid severe, unreasonable grading, but we must have a standard to go by. So far only two complaints in this regard have reached us, and we have issued instructions to our inspectors to use every care. We may point out that our grading for the highest type of seed potato is no more severe than the grading to which Canada A Grade table potatoes are subjected under the Root Vegetables Act. In this grade the diameter of potatoes of the round varieties shall not be less than one and seven-eighths inches, and of potatoes of the long varieties, one and three-fourths inches.

An Irish Cobbler potato of the diameter required under the Canada Grade A weighs actually four and a half ounces. A Green Mountain of the respective diameter weighs about five ounces. It will be seen from this that we are even more liberal in our grading standards. For the sake of uniformity it would seem desirable, therefore, to continue as a basis our present standards.

Our attention has very recently been directed to a complaint that some of the growers of potatoes in the St. John valley were dissatisfied with the requirements of our department as regards certification, and that they formed an association with the idea in mind that they would do their own inspection work and disregard the Dominion service altogether. One grower it is reported to us, had a large crop of Irish Cobblers which had passed field inspection, but when it came to bin inspection only 35-40 per cent of them came up to the requirements of our regulations. We have not been able to trace this case from our records, but we are quite aware that there are growers in New Brunswick who prefer to have their fields inspected, but when it comes to grading they absolutely refuse to conform to our requirements. As pointed out already, our grading standards are by no means unreasonable; and we know that it has been the practice for many growers to sell their seed on a copy of our inspection record—thereby sacrificing the important object, namely, the production of seed potatoes of a very high grade, but not higher than one is able, with care, to produce under general conditions in New Brunswick.

To give you an instance of the value of this certification, one of the most influential shippers reported to us that he sold a large grower in Fort Fairfield, Maine, six carloads of New Brunswick Irish Cobblers for his own use. These potatoes were sold to him while he had some 10-15,000 barrels of Maine certified seed in his warehouse. He disposed of his Maine seed at a price and paid the New Brunswick shipper $2.25 per barrel more for the New Brunswick seed in order that he might have stock of this excellent quality for planting. Since Maine potatoes are grown under identical conditions as those of New Brunswick (the fields in question were in fact less than fifty miles apart and the soil practically identical), the only reason we can ascribe to this is that New Brunswick seed is so carefully rogued in field and bin that there is almost an absolute certainty on the part of the purchaser that our potatoes will yield an excellent crop with a minimum of waste and disease. We would further point out that New Brunswick growers are heavily handicapped at the start by a duty of fifty cents per hundred pounds on any potatoes going into the United States, so that in ordinary years with ordinary values, this tariff acts as an embargo against the ordinary run of seed potatoes. The only salvation therefore, as far as Eastern Canada is concerned, is to produce a seed potato of a type and standard of such a high grade that it will be in an entirely separate class from the United States grown product. Just as soon as we listen to the fortunately few representations, and lower our standards to make them equal to Maine standards, we will be forced into competition. The Maine grown seed potato costs as much to produce as the New Brunswick potato, and they could sell at a handsome profit, while Canada with a fifty cent tariff against them would be working at a loss.

Would you consider it reasonable and sane under such conditions, which are by no means the exception, but rather the rule, to lower our grades and standards? If some of the growers demand this it would be far better for them to go in for table stock, but they should not be allowed to interfere with the successes of the painstaking grower of the entire Dominion.

It would be of great value if the members of this committee who are interested in these questions could see their way to support our aims, which have been presented in an absolutely fair manner, dealing with all the pros and cons of this grading situation.

Now just one word or two on the point of growers who wish to do their own certification. Some growers are known to us who had tags printed with the words "Government inspected N.B. seed potatoes." These men had their fields inspected, but they were rejected for reasons of disease. This practice has caused us no end of trouble. Naturally, this practice misled the unsuspecting purchaser to believe that the "Government" stood behind such certificate, and complaints reached us as to the very inferior condition of potatoes. In one case 69 per cent were showing rot. Would the government make good the damage or loss? This kind of thing does nobody any good. If people persist in this they will undermine the reputation of the Canadian seed potato gained at very considerable exercise of labour and effort. The department being impressed with the consequences of this somewhat irregular use of its name and service, authorized the following regulations to be inserted under the Destructive Insect and Pest Act under which this service is carried on:

General Regulations, P.C. 1150, passed June 26, 1923, effective on and after September 1, 1923.

REGULATION V.

An inspector shall have the power to inspect before export to any foreign country, or shipment within the Dominion, any plant, and to grant a certificate according to the requirements of any country demanding such, or for domestic purposes.

All certificates so issued must bear a copy of the official seal of the plant disease or insect pest inspection service carried on under this Act.

In the case of potatoes for which such certificates are required, no person shall be allowed to sell or offer, advertise, expose, or hold in possession for sale, for seed purposes, any potatoes in any manner or form described or designated as certified, inspected, registered, selected, or disease-free seed potatoes unless such potatoes are contained in sacks, barrels, or other containers, to each of which shall be durably attached a certificate stating that any such potatoes contained therein have been inspected in the field and after harvest by an inspector under the Destructive Insect and Pest Act and have been found sufficiently vigorous and free from serious diseases, other pests, foreign varieties, mechanical injury, or other blemishes, to warrant them being classed as Extra No. 1 Certified Seed Potatoes. All such certificates shall bear the grower's name or number as well as a copy of the official seal of the Plant Disease Inspection Service of the Department of Agriculture, Canada.

It is fair to report that in some cases growers offended against this regulation in ignorance of the law. Some of them on being appealed to readily agreed to discontinue their practice, and others who remain indifferent or continue this practice may be required to mend their ways under slight pressure.

I will now briefly discuss the organization and cost of inspection.

The work is carried on under the direction of the Dominion Botanist, a chief divisional officer of the Experimental Farm system, Ottawa. Associated with him is the Chief Inspector, who looks after the district inspectors in the

various localities outside Ottawa, who again act as supervisors and control inspectors (of a number of inspectors).

The chief inspector and district inspectors are permanent officials, whereas the inspectors are appointed every season. We endeavour to secure men with previous experience in our service, which is somewhat difficult, because of the temporary nature of our employment, many inspectors who are college trained men securing permanent positions elsewhere. While this arrangement has been fairly satisfactory, it must be pointed out that it very largely interferes with the efficiency of the service due to the use of necessity of inexperienced men, whom we have to train year after year. While we would prefer to employ a number of inspectors throughout the year, we find that during the winter months the work in many districts would not be sufficient to keep them employed. Moreover, it would very materially increase the cost of our service.

We are constantly up against the difficulty of deciding whether we can afford to sacrifice efficiency to economy. So far nothing very serious has arisen, but we always feel somewhat insecure when we know that an inexperienced man is performing rather responsible duties. For this reason our district inspectors are utilized to perform control inspection after more or less inexperienced men have performed their work. This is the means by which at present we have been able to work with a very satisfactory degree of efficiency. While the Department would no doubt be ready to assist us in this matter, we feel that the service, as yet rendered to the farmers without any cost whatsoever, should be continued on as economical a basis as possible. I may say that in the United States a charge is made for the service of inspectors, and that we have given consideration to the desirability of making our service pay for itself, but so far have not been able to make the necessary concrete suggestions.

The following tables will convey an accurate idea as to the extent of our work and the cost of service for the past year (1923).

PRINCE EDWARD ISLAND

| | |
|---|---|
| No. fields inspected | 825 |
| No. acres inspected | 3,213 |
| No. fields passed | 754 |
| No. acres passed | 3,049 |
| Average yield per acre of fields passed (in bushels) | 247.6 |
| Total yield in bushels from fields passed | 754,932 |
| Total number bushels certified | 452,959 |
| No. men employed | 7 |
| Cost of inspection | $7,575 |
| Average period of employment | 5 mos. |

NOVA SCOTIA

| | |
|---|---|
| No. fields inspected | 170 |
| No. acres inspected | 334 |
| No. of fields passed | 124 |
| No. acres passed | 224 |
| Average yield per acre of fields passed (in bushels) | 183.7 |
| Total yield in bushels from fields passed | 61,355 |
| Total number bushels certified | 36,813 |
| No. men employed | 2 |
| Cost of inspection | $2,435 |
| Average period of employment | 5 mos. |

NEW BRUNSWICK

| | |
|---|---|
| No. of fields inspected | 837 |
| No. of acres inspected | 3,475 |
| No. fields passed | 485 |
| No. acres passed | 2,223 |
| Average yield per acre from fields passed (in bushels) | 283.4 |
| Total yield in bushels from fields passed | 629,998 |
| Total number of bushels certified | 148,990 |
| No. men employed | 8 |
| Cost of inspection | $10,850 |
| Average period of employment | 5-6 mos. |

QUEBEC

| | |
|---|---|
| No. fields inspected | 417 |
| No. acres inspected | 959 |
| No. fields passed | 268 |
| No. acres passed | 573 |
| Average yield per acre from fields passed (in bushels) | 277.4 |
| Total yield in bushels from fields passed | 158,950 |
| Total number of bushels certified | 75,370 |
| No. men employed | 4 |
| *Cost of inspection | $2,615 |
| Average period of employment | 5 mos. |

*The provincial Department of Agriculture paid the salaries of two of the four men during field inspection.

ONTARIO

| | |
|---|---|
| No. fields inspected | 304 |
| No. acres inspected | 509 |
| No. fields passed | 171 |
| No. acres passed | 345½ |
| Average yield per acre from fields passed (in bushels) | 233.4 |
| Total yield in bushels from fields passed | 80,756 |
| Total number of bushels certified | 48,453 |
| No. men employed | 6 |
| *Cost of inspection | $7,260 |
| Average period of employment | 5 mos. |

*The provincial Department of Agriculture paid the salaries and travelling expenses of two of the six men.

MANITOBA

| | |
|---|---|
| No. fields inspected | 102 |
| No. acres inspected | 391 |
| No. fields passed | 74 |
| No. acres passed | 267 |
| Average yield per acre from fields passed (in bushels) | 235.6 |
| Total yield in bushels from fields passed | 62,905 |
| Total number bushels certified | 29,143 |
| No. men employed | 2 |
| Cost of inspection | 3,720 |
| Average period of employment | 4 mos. |

SASKATCHEWAN

| | |
|---|---|
| No. fields inspected | 108 |
| No. acres inspected | 446 |
| No. fields passed | 78 |
| No. acres passed | 243 |
| Average yield per acre from fields passed (in bushels) | 231.8 |
| Total yield in bushels from fields passed | 56,791 |
| Total number of bushels certified | 34,074 |
| No. men employed | 2 |
| Cost of inspection | $4,425 |
| Average period of employment | 5 mos. |

ALBERTA

| | |
|---|---|
| No. fields inspected | 151 |
| No. acres inspected | 354 |
| No. fields passed | 107 |
| No. acres passed | 175 |
| Average yield per acre from fields passed (in bushels) | 220.0 |
| Total yield in bushels from fields passed | 38,500 |
| No. bushels certified | 23,100 |
| No. men employed | 2 |
| Cost of inspection | $3,965 |
| Average period of employment | 5 mos. |

It will be observed that no reference is made to the Province of British Columbia. British Columbia has carried on its own inspection service, but since the promulgation of the regulations already referred to, an arrangement has been made with the provincial authorities that makes their inspection service conform to the Dominion regulations.

We are this year placing two Dominion inspectors in British Columbia to aid them in extending their service.

The province is supplied by the Dominion with a certificate in the form of a tag attached to all our certified potatoes throughout the country, and we find that this method promises to work satisfactorily.

In Prince Edward Island the progress that has been made in potato inspection and certification is most encouraging. We have been assured by the provincial authorities as well as by the growers themselves that our services are of vital importance to the potato industry of the Island Province. It will be noted that 452,959 bushels were actually certified. The cost of this certification was $7,575. This would mean a cost of 1.67 cents per bushel of certified seed. It must, however, be borne in mind that 825 fields were inspected, of which 754 were passed. In consequence, farmers who had their crops inspected but which did not qualify, should naturally assume their share. It will be noticed that 60 per cent of the total harvested passed final inspection.

In the Province of Nova Scotia we are dealing almost entirely with the Garnet Chili industry, the Garnet Chili variety being grown for export to Bermuda. We are glad to report, however, a growing interest in the certification service by men in the province who produce other varieties. Those familiar with the Garnet Chili variety will note that a surprisingly large percentage of the potatoes produced, on inspected fields, passed final inspection.

In New Brunswick we inspected during 1923, 837 fields, of which only 485 were passed. There is no reason why a larger number of potatoes should not have passed final inspection, but it is in New Brunswick that the practice very largely prevails to sell potatoes without final inspection, which accounts for the smaller amount of potatoes actually certified. In New Brunswick we have spent $10,850, and have certified only 148,990 bushels; whereas in Prince Edward Island, for the sum of $7,575, we were able to certify 452,959 bushels. This difference is illustrative of the relative interest that is taken in the inspection service in the two provinces. It is fair to state that while every province is receiving exactly the same service, we are spending more money in New Brunswick than in any other province, and that we find the least encouragement to continue our service in that province. To Prince Edward Island great credit is due for the excellent co-operation by every individual, which spirit has prevailed since the commencement of this work in the Island with hardly a single serious conflict. It has always been a mystery to us why the Province of New Brunswick should not have done 100 per cent better, which they easily could do providing Prince Edward Island growers may not then be induced to treble their efforts.

In the Province of Quebec, quite a lot of promising work has been done, the provincial Department of Agriculture co-operating in every way possible. In 1923 we inspected 417 fields, of which 268 passed, and the prospect for this year is a largely increased interest on the part of the growers, stimulated by the interest which is also being evinced in the control of potato diseases by the District Representatives of the provincial Department.

In the Province of Ontario the work is carried on in very close co-operation with the provincial Department of Agriculture, which concerns especially the production of seed potatoes in Northern Ontario for use in the more southern regions of the province.

The work in the western provinces, Manitoba, Saskatchewan and Alberta, owing to the vast distances to be covered is more difficult to centralize, but has certainly made very satisfactory progress after the usual period of indifference or antagonism which any new service generally meet with, but which we now feel has been overcome.

It may be said that the Canaadian certified seed potato has established for itself a most favourable reputation. This has largely been due, if not

entirely, to the co-operation which we have received from most of the producers of certified seed. In some of the provinces the interest taken in this work is greater than in others. In New Brunswick, that has for years been not favourably inclined towards co-operation, we find in the report of the New Brunswick Department of Agriculture for 1923 the following statement:

"To prove the value of certified seed, arrangements were made in the spring with some farmers of the Caraquet Shore to plant a small quantity of certified seed along with their own seed to find out if certified seed would give better results under the same conditions. In some cases the difference in yields was almost unbelievable. However, the comparative yields were checked up by actual digging and weighing, and were as follows:—

| | No. bus. merchantable. | No. bus. unmerchantable. | Total bus. |
|---|---|---|---|
| T. J. Riordon, Riordonville— | | | |
| Certified Seed | 202 | 17 | 219 |
| Own Seed | 90 | 30 | 120 |
| Adelard Leger, Caraquet— | | | |
| Certified Seed | 319 | 17 | 336 |
| Not Certified | 251 | 21 | 272 |
| Joseph Lacroix, Caraquet— | | | |
| Certified Seed | 296 | 16 | 312 |
| Not Certified | 109.5 | 15 | 123.5 |
| L. P. Duguay— | | | |
| Certified Seed | 250 | 16 | 266 |
| Not Certified | 191 | 33 | 224 |

The results secured taught a great lesson to those who used the seed potatoes on the Caraquet Shore. I have reason to believe that these demonstrations will have considerable effect on the future potato crops of that region."

(From the report of J. E. McIntyre of the New Brunswick Department of Agriculture, 1923.)

For several years Canadian certified seed potatoes were entered in the comparative annual seed source test carried on in Long Island and New Jersey. At these places the most promising types of certified seed from all over the Continent of America are assembled and grown side by side under identical conditions. Samples were submitted for this test from Prince Edward Island and New Brunswick. The results obtained, which are determined by American officials, have greatly enhanced the reputation of Canadian certified seed and have brought to this country a large amount of trade. It is gratifying to record here the just and fair method of judging that is given to our potatoes, which have more than held their own in the annual tests, and which again would emphasize the urgent necessity for the maintenance of our standards for certified seed. At the present time our standards are higher than most of those in force in the States, and we feel very strongly that they should remain so if the excellence of our product is to be rewarded by the continued and increasing demand for certified seed potatoes from the Dominion of Canada.

The following table is submitted as an indication of actual gain of the inspection service over averages of potatoes obtained under general farm conditions:

| Ten year average yield of potatoes. | | Certified Seed. | |
|---|---|---|---|
| Dominion of Canada | 146 | bushels | 238 bushels |
| Prince Edward Island | 160 | " | 247 " |
| Nova Scotia | 180 | " | 183 " |
| New Brunswick | 181 | " | 283 " |
| Quebec | 156 | " | 277 " |
| Ontario | 115 | " | 233 " |
| Manitoba | 130 | " | 235 " |
| Saskatchewan | 134 | " | 231 " |
| Alberta | 148 | " | 220 " |

From the above figures, admitting that the statistics are in favour of certified seed, it is, however, most reasonable to assert that Canada could readily

increase its potato production by fifty per cent at least by the use of certified seed potatoes. While the Division cannot well look after the discovery of new markets nor yet compel farmers to make the use of certified potatoes more general, we do, however, widely distribute to all the government branches—federal and provincial—interested in marketing, as well as to the principal seed merchants, complete lists of the growers whose fields were recognized in our inspection.

I discussed this question about the increased production of potatoes yesterday with the Director of the Experimental Farms, who pointed out to me that some people may be under the impression that an increase in the production of potatoes is perhaps not quite as desirable since there are no ready markets. I wish to point out to you that development in Canada of the potato industry is absolutely without limit. We have not yet touched the utilization of the potato for industrial purposes, such as the manufacture of evaporated potatoes, or the manufacture of starch; we are manufacturing starch at the present time at the rate of 5 per cent of our entire consumption. Surely it is possible for us to to become entirely independent of all imports of starch. We have never touched the question of using potatoes for the manufacture of industrial alcohol, a substance that is being used on the continent of Europe for the replacement of gasoline for running farm engines, and so on, so that if we produced more potatoes than we are doing at the present time it is quite probable that an impetus may be given to the utilization of potatoes in these directions.

Reference may here be made to the certification of potatoes required for export to Cuba. The following figures are of interest as indicating the effect of the Fordney Tariff upon exportation of potatoes to the United States: In the year 1922, in which the Fordney Tariff came into effect, exportation of Canadian potatoes dropped from 1,822,000 bushels to 771,638 bushels, and continued in its drop up to date. Owing to the application previously of the Emergency Tariff, the export of potatoes from Canada to the United States dropped to 1,822,000 bushels for the year ending March 31, 1922, as compared with 4,204,000 bushels for the year ending March 31, 1921, and 5,480,000 bushels for the year ending March 31, 1920.

It must be pointed out that the trade with the United States is mainly in a superior quality of potatoes, and it is therefore very valuable. You will no doubt realize that we can only hope to maintain our trade with the United States if we continue to offer them a product superior to their own. Coincidentally with the decrease of the trade to the United States there must be recorded a decided increase in our exports to Cuba, from 510,000 bushels in 1920, to 1,688,207 bushels in 1923.

In conclusion, while dealing with the subject of improvement of potatoes by certification I may refer here to suggestions which have reached us from time to time that our inspectors should be familiar not only with the determination and recognition of diseases and varieties, but also with the methods of selection towards a general improvement of the potato crop of the Dominion, and to explain thoroughly such methods to the farmers whose fields they inspect, it being argued that our present system does not render the service in this regard which the farmers have a right to expect. This is merely another instance indicating that people who grow seed potatoes are becoming more and more interested in that they feel the need for additional useful advice.

We have pointed out that inspection and certification as carried on at the present time, followed by a recognition of disease free or practically disease free fields, has resulted in a remarkable improvement of yields as compared to the average yields. Such increase has been over one hundred per cent. We feel confident, however, that we have by no means reached the maximum that is possible with the necessary amount of care. Our experience has shown that

from 40 to 80 per cent reduction of yield has been due to the presence of disease. We still maintain that disease freedom is of fundamental importance. It is immaterial how true a variety may be to name and type, so long as it is not sound it will never produce a satisfactory crop. A variety of potatoes may yield 400 bushels per acre, which is by no means rare. Experiments at the Central Experimental Farm carried on some years ago with by no means that type of potatoes which our certification service is producing to-day, have yielded us in Ottawa on four-acre plots at the average of 450 bushels to the acre. You will remember here that the average for Canada is 146 bushels. While such high yields may be readily obtained under favourable conditions, as regards soil, climate and culture, it is no guarantee that it will be perpetuated through its progeny.

As regards the suggestion that our service should instruct the farmers on the best method of selection, I unreservedly agree that such would be most desirable were our present knowledge on this subject really complete. There is no more contradictory evidence than in the case of the production of high yielding strains by selection, and for this reason we have so far refrained from giving advice to the practical man simply because aside from well-known general lines, no method has so far been discovered which will really give permanent results. Investigations have been conducted for a number of years to ascertain the principles that govern the permanence of yield increases. It is incorrect to claim that a particular strain grown under exceptionally suitable conditions will live up to its high-yielding faculties when grown under less favourable conditions, but there is no doubt that even in plants vegetatively reproduced as the potatoes, we may discover valuable and fundamental principles of use in maintaining the high yields of certain strains.

I have endeavoured to deal in the foregoing with the potato inspection service from as many aspects as I could think of. I am aware of the remarkably good results that have been achieved, but I also realize that we have by no means reached the maximum production at the most economic expenditure.

I have endeavoured to deal with certain criticisms more or less well-founded, and I have pleasure in assuring the members that any constructive criticism is always cordially appreciated, and I would thank you for any suggestions you may wish to make in this regard.

Mr. CALDWELL: Regarding the control of aphis, what is your recommendation?

Mr. GÜSSOW: The best results have been obtained so far by the use of special dust mixtures.

Mr. CALDWELL: It is almost impossible to reach them with a liquid spray?

Mr. GÜSSOW: Yes.

Mr. CALDWELL: Because they are underneath the leaf.

Mr. GÜSSOW: The manner of applying the dust is in this way: it is done by a special distributor, which is drawn between the rows, sliding along the ground, which distributes the dust over the plants at a time when there is dew on the leaves.

Mr. CALDWELL: But our plants get so large that you cannot tell where the rows are, and that is the usual time that the aphis get busy.

Mr. GÜSSOW: The question of the control of the aphis has only become important during the past two years.

Mr. CALDWELL: That is, you have only realized that it has become important in the last two years.

Mr. Güssow: Only two years ago, when it was definitely shown that the aphis sucked the juices of the diseased plants, and conveyed the disease to perfectly sound.

Mr. Caldwell: As well as killing the plant they suck the juice out of it? That is, they lower the vitality of the plant?

Mr. Gussow: Yes. Of course, the plant has already been diseased and is of lower vitality; the control of the aphis is by no means satisfactory. I have discussed this with the entomologists of the Department, and they are now working on this problem. We are most anxious to know what can be done, because I believe the aphis is the more important of all other agencies.

Mr. Caldwell: Then you spoke of powdery scab. Is there such a thing as powdery scab in Canada?

Mr. Güssow: Yes, quite so. Powdery scab is an entirely different scab or disease from the so-called common scab. I believe you are probably familiar with the experiences which we have had with powdery scab in New Brunswick.

Mr. Caldwell: With so-called powdery scab.

Mr. Güssow: I beg your pardon, sir, it was true powdery scab.

Mr. Caldwell: Was it not demonstrated, that potatoes which were supposed to have powdery scab were planted and grew to perfectly clean potatoes the next year?

Mr. Gussow: That would not dispose of the fact that powdery scab was originally present, because it is a common experience that in certain especially dry seasons you may plant powdery scab potatoes and you may not have a single potato affected with powdery scab.

Mr. Caldwell: That was my point, that this had been done.

Mr. Güssow: Quite so.

Mr. Caldwell: That does not prove it was not powdery scab?

Mr. Güssow: If you have an excessively wet year, you may have these potatoes severely affected by this particular scab, and such evidence is perplexing to the farmers. They planted potatoes affected with powdery scab and secured a perfectly sound crop. Of course, in such cases they found it very difficult to believe that powdery scab amounted to anything.

Mr. Caldwell: But that is no proof it was not powdery scab.

Mr. Güssow: That is no proof. It is very difficult for the farmer to distinguish this particular disease from common scab, unless you do so by means of a microscope. When, under a microscopic examination, this minute organism, scarcely visible to the naked eye, appears as large as these potatoes, it would then be very easy to distinguish the remarkable differences between the powdery scab and the common scab; the difference is as marked as that between a pea and a bean, as indeed it is to the careful observer from the general appearance. If you are ever at the Experimental Farm, I shall be glad to show you.

Mr. Caldwell: I knew this had happened, that badly infected so-called powdery scabbed potatoes had been planted and grew perfectly clean potatoes. One man planted them where he never expected them to grow, in a fence corner or somewhere where they did not have a very good chance to grow. Now, you were speaking of the bogus tags, and that is a matter I have taken up with the Department on different occasions, because while we have not many men who do a thing like that, we have some, and the farmers growing certified seed are

very resentful and we think the Department should take very drastic steps to punish these men. By the way, I would like to give you some private information, and I would like you to follow it in this regard, having to do with dealers. I know of one dealer in particular, and I have statements that there are others doing it, but I know of one, a dealer who bought potatoes from a farmer who never had his potatoes inspected at all, and when they hauled them in they simply got a Bill of Lading and later got cash. In giving this bill to the farmer, the bill stated so many barrels of certified potatoes. The farmer showed this bill to me and he said, "I cannot understand this. What do you make of it?" I said that I knew exactly what to make of it. When these bills are brought in he puts them on his file to show that they are certified, when there really was never an inspector near the field, and in this way our growers are getting in bad, because this man will say, "I bought so many loads of certified potatoes from this man." The dealer in turn is passing this along with these bogus tags, and that it is a thing that is doing a big injury to our seed potatoes.

Then, with regard to the certification, there is nobody who is interested in growing seed potatoes who will dispute the benefit of the seed certification. There have been quite serious complaints, and all the seed growers are wanting the regulations relaxed with regard to field inspection. There have been a good many complaints with regard to the physical grading in New Brunswick, and the very fact that you yourself mentioned that there is an association formed in New Brunswick with the idea of doing their own certification—which will cost them considerable money—is an evidence that this complaint is very strong and very widespread. Another thing I understand—and I have this on pretty good authority—is that the physical grading is not so rigid in Prince Edward Island as it is in New Brunswick, and the complaint is not that they are taking out diseased potatoes, or potatoes that should not go in, but that the potatoes must be all of exactly the one shape, which I think any man who grows potatoes knows is almost an impossibility. I cited one case in the House a while ago of a neighbour of mine who had about 4,000 barrels which passed the two field inspections, and when they came to grade them out, after grading all afternoon I think they had only a few barrels passed, the rest were discards, and he said he would not have had over 400 barrels out of 4,000 passed. They were all sound, all of one variety, all free from disease in the field. They were a good potato, but probably some of them were off-type, and probably some were oversize, and the evidence that this complaint is widespread is the fact that this association has been formed to do their own inspecting. It is a serious situation which is not conducive to the best results. I think one of the reasons stated why there were so few of our fields inspected was that they would not submit to the final grading, which is another evidence that this is a very widespread affair. Another thing is that New Brunswick is immediately alongside of Maine, and the American buyers come to New Brunswick in the summer, look the fields over, and send their own men to grade them when they are loaded, and they say they are perfectly willing to take potatoes with this kind of grading and do not require the Government grading. That is another reason for this association being formed. I am sorry to see this situation. I would like to see close co-operation between our growers and the department, because I recognize it is the most efficient method. At the same time, I would like to see your department and this association get together and see if you cannot arrive at some understanding satisfactory to your department and also to the growers. I do not think there is any disposition on the part of the seed growers in New Brunswick not to comply with reasonable regulations.

Mr. Güssow: I am greatly obliged to you for calling attention to these points. We have endeavoured to arrange for a meeting between the members of your association and the shippers and the general representatives of the

industry concerned. I may say that I have ever felt that by meeting the people and by explaining to them our reasons and our limitations, the limitations of any government service as far as this is concerned, we must come to some agreement whereby we will be able to reach satisfactory conclusions that will be satisfactory to all concerned.

Mr. CALDWELL: You are arranging for a meeting of that kind?

Mr. GÜSSOW: Yes, sir, and as far as these complaints are concerned, it is a very curious thing how such complaints originate; a minor complaint grows apparently, in importance, by being told from one place to the other.

Mr. CALDWELL: You are not insinuating that I am exaggerating about this, I hope?

Mr. GÜSSOW: If I have conveyed that impression, I am certainly misunderstood. Nothing was further from my mind.

Mr. CALDWELL: Because the circumstances I have spoken about have come under my personal observation.

Mr. GÜSSOW: Yes. I can give you one experience that has come under my own observation, with the Superintendent of the Dominion Experimental Farms. He complained in very strong terms about the severity of the inspection to which we subjected his certified seed. He told us that less than 60 per cent of the potatoes which he grew on the Experimental Farm were passed according to our standards. Well, of course, it is most undesirable that 40 per cent of a crop grown from certified potatoes should be discarded. We could not think of continuing a service satisfactorily along such lines, and I requested this man to send us samples, which he did, and we agreed that the grading was very severe. We made inquiries, and found that these were graded particularly for the purpose of exhibition, and that therefore the grading was very severely done, and it was only concerning a lot of not more than I think eight barrels altogether, although at first I thought perhaps it was eight hundred barrels. Curiously enough, I bought personally some of these potatoes for growth in a small garden. Upon receiving these potatoes, I found that at least eight per cent more should have been graded out of these potatoes. The sample which was sent to me in the first instance did not represent the actual grading done in that case, so when one looks into some cases, it is sometimes different. I am in favour of accepting the grower's or shipper's point of view, whenever I am able to, but we are looking very carefully into these things, and while in a number of cases the grading was perhaps unnecessarily severe, in many other cases we found that the shipper has been slightly guilty of exaggeration. We have been carrying on this service now for ten years. We have never found it necessary once to go to law. We have been accused over and over again of all sorts of failures in our inspection service; we have found many times shippers all over the Dominion of Canada offending, but we have been always able to get together and to settle any difference among ourselves in a satisfactory manner, and I hope we will be able to do that in the province of New Brunswick as soon as we can hold this meeting.

Mr. CALDWELL: One other thing. What would be the possibility of your Department carrying on research work with regard to utilizing potatoes for the manufacture of commercial alcohol or some other products you spoke of? I might say—you spoke of manufacturing potato starch. This has been tried in New Brunswick. During the war we had one firm who erected a mill and put up a plant for the manufacture of potato flour, but as soon as the war was over the factory was closed up. The people who were behind it said that the reason they closed it was because they could not get a price for the product which would keep them going. This firm also established a starch factory during the war and manufactured starch for about two years, and they discon-

tinued that also. I could not understand why we could not manufacture starch, because in Maine there are very many factories which manufacture it. I have urged very strongly that some of our capitalists get together and put up starch factories in the potato sections.

Mr. Güssow: I feel that the lack of success which the New Brunswick manufacturers experienced is due to the competition, the importation of starch from elsewhere, because at the present time only about 5 per cent of the starch used in Canada is manufactured here. I know, unfortunately, that nearly all starch factories had to close up after they filled the orders they had booked, but I maintain that if this industry is placed on a really rational basis of co-operation, the way it is done elsewhere, where such industries have added millions of dollars to the national wealth, there is no reason why Canada should not eventually be successful the same way. At the present time I would caution very much against going into this industry to any extent, because of the prevailing conditions. We have no market.

Mr. Caldwell: For starch?

Mr. Güssow: We have a market for starch; 95 per cent more than we have at the present time, which, however, is supplied by importation from abroad. We can increase our market by 95 per cent more, providing we would not be up against the importations from elsewhere.

Mr. Caldwell: The manufacture of starch is a very inexpensive process.

Mr. Güssow: That may be, but it would be aided by a steady supply. It is a question of close co-operation. You have to contract for the supply of potatoes for five years at least. When this was tried it was found that during these contract years the men will get 40 cents at the starch factory, and they could make $1.80 if they sold elsewhere.

Mr. Caldwell: In Maine, only the culls are made into starch.

Mr. Güssow: The same is true for Canada, but under our conditions at the present time, it is difficult to develop that industry because of the lack of markets for the finished products.

Mr. Caldwell: I think, Mr. Güssow, I can give you the main reason. It is that the use of starch is very limited in Canada, and while we only manufacture 5 per cent of what we use, the whole use of starch is very limited, due to the fact that we do not have the manufacture of cotton goods in our country. Our consumption of starch is very small, but still I would like to see starch manufactured here if possible.

Mr. Güssow: Starch is not the only profitable product to manufacture. The evaporated potato—that is a potato that is evaporated at the rate of four to five bushels to make one bushel of evaporated potatoes, which are very useful for stock feeding, and which of course will reduce the freighting and transportation charges on these potatoes over a wide area to one fifth of the cost at the present time, and then there is the question of the manufacture of industrial alcohol.

Mr. Caldwell: Where is the market for evaporated stock?

Mr. Güssow: There is no market for it in Canada at the present time. I presume that is because people do not know about it, but once it is demonstrated that these evaporated potatoes form a most economical method of feeding, that they will keep indefinitely, that they require no difficult storage, that they can be shipped all over at one-fifth of the rate which is paid at present, I think a demand would soon establish itself.

Mr. Thurston: What kind of stock is it fed to?

Mr. Güssow: The flaked or evaporated potato is a most useful fodder for almost all farm animals. Experiments conducted in Europe in the feeding of

steers, dairy cattle, sheep, pigs and horses have demonstrated that evaporated potatoes replace corn, barley and oats, the latter to some extent only. The increase in weight of the experimental animals showed up in favour of evaporated potatoes.

Mr. SPENCE: A while ago you were discussing the matter of production of potatoes, and you said that the difference in production was about 100 bushels an acre. Does that mean that because it is certified seed you get 100 bushels more to the acre than by using say the culls you take out of the certified seed, or what do you mean?

Mr. GÜSSOW : If you plant uncertified seed of the best type that a farmer grows in Canada, under the usual conditions of culture, you have the record here and you will have harvested about 150 bushels per acre. If you plant seed which has been certified you may have 220 to 250 bushels per acre from the use of such seed, which has eliminated many of the agents which cause low yields. Is that clear?

Mr. SPENCE: I have seen just as good seed come from an individual grower as the Government certified seed. Why should the one not produce just as much as the other?

Mr. CALDWELL: If the potato which is not certified is just as good as the certified potato, then you should get almost the same. If they are not certified, though, you are taking the risk of disease in them.

Hon. Mr. SINCLAIR: Mr. Chairman, I might add something to the discussion which is going on. The growers who are taking advantage of the certified seed plan are following the principle of hill selection to replenish their own seed. The man who goes to the extent of buying a lot of fertilizer and putting in so much time and work on the crop, will not do that without taking good care of it. I know that most of our growers select their seed from hills by hand, and they will not take a set from a stock which does not yield six healthy potatoes. When you do that for two years, you can almost double your yield per acre. It is by that system you get an increased yield from certified seed, and the more you can encourage that system among growers, the more benefit we will get.

I would like to ask Mr. Güssow if he has had any experience or had any tests in using small potatoes for seed. I ask this question on account of knowing that the present year, on account of the scarcity of seed, a great many growers are buying the sound potatoes of the smaller type. What will that lead to?

Mr. GÜSSOW : In certain countries, England, Scotland and Ireland and other European countries, they only employ the small potatoes about the size of a hen's egg, uncut, for seed, and they get very good results. In this country the use of small whole tubers is just as satisfactory, other conditions being equal, but the difficulty is that the smaller tubers are only under certain circumstances giving as good yields as cut sets. This has been demonstrated by Professor Zavitz at Guelph, from years of actual experience, when it has been proven beyond doubt that a set of potatoes of about one ounce, another of two ounces, three ounces, four ounces, and so on up to a whole tuber of twenty ounces, according to the increase of the weight itself, there was a definite increase in the weight of the tuber yield. The larger the amount of potato given with each eye, the larger will be the returns up to a certain limit; of course, the more expensive your cost for seed becomes.

These two plants which I have here are grown from one single eye. We have a series of these potatoes at the Farm which are being planted for experimental purposes, for the determination of the increase of yield that may be obtained by selection. These were very accurately punched out by a punch of about half an inch diameter and one half inch of the body was allowed. The

cost of seed in such experiment is very little—but in dry years you may not get any results. These potatoes planted out and looked after under ordinary conditions will give us about half the yield of an ordinary set, but as soon as we increase the weight of the parent tuber, we will have a corresponding increase according to the weight of the set used.

Mr. CALDWELL: That was a question I was just on the point of asking you. How large a cut set, that is, to what size do you get the biggest yield? You mean there is a limit to the size that will give you a bigger yield?

Mr. GÜSSOW: The usual weight is between two and one-half ounces and three ounces to a set. That has given generally the best results.

Mr. CALDWELL: That would be the maximum?

Mr. GÜSSOW: Yes, that is most economic. If you are using more, heavier sets, you have to use more per acre, and that is rather expensive. We paid around $3.50 for one bag of seed potatoes, and it would amount to quite a consideration.

Mr. CALDWELL: Do you get a bigger yield from a three ounce cut than a one ounce cut?

Mr. GÜSSOW: Yes, undoubtedly.

Mr. CALDWELL: My point is this, Mr. Güssow. Your contention is that a seed potato should not be over twelve ounces. How many eyes do you consider should be in a set?

Mr. GÜSSOW: At least two.

Mr. CALDWELL: Then your largest potato would only make four sets, that is a pound potato would only make four sets, of the size that is profitable. Therefore, I think the contention that even larger potatoes should be allowed in the seed is sound. If, for instance, your most profitable set were an ounce, then I could see why potatoes should not be over a pound, but a potato weighing over a pound has more than eight eyes and should make more than four sets, and therefore I think the contention of the seed growers that a twelve ounce potato is a little small for the maximum is very sound. That is one of the requests of the Seed Association, that the maximum size of the seed potato should be about twelve ounces.

Mr. SPENCE: I am opposed to that, as the man who has to sell them. Two years ago the potatoes were very large, and a great deal of the potato was wasted, and people hated to pay for the waste. You lose half a pound of potato that is no good at all, the bottom end of the potato; you could cut it off and throw it away altogether. Of course, that applies particularly to the Irish Cobblers, and not to the Green Mountain brand. There is another thing that I wish to call your attention to, and that is a potato, a fairly large potato with a hollow centre. It was the most peculiar thing I ever saw, a long thin potato, hollow in the centre; there was a whole carload of that kind. What would you say about that?

Mr. GÜSSOW: Are you sure they were hollow?

Mr. SPENCE: Absolutely, a little hollow, and good and black; the most deceitful potato I ever saw. I have no doubt that the man who shipped them thought them perfectly sound.

Mr. GÜSSOW: That is often a result of bad storage of potatoes.

Mr. SPENCE: I could not believe that they were hollow, but they were black in the centre and a little hollow. I presumed it might be from storage.

Mr. GÜSSOW: Yes. This is known as "Black Heart," if you cut the potato right through the centre you find a star shaped black centre; quite solid at first but later in spring this blackened tissue cannot expand in the same way as the

surrounding tissue and in consequence a crack is forming there. This has been artifically produced by storing potatoes in badly ventilated cars, where the temperature was high. In fact, in pitting potatoes experimentally, we can produce this in all our potatoes if we close out the ventilation, simply allowing the heating of these potatoes with the lack of ventilation.

Mr. CALDWELL: How long does it take? Would it be possible for that to happen in transit?

Mr. GÜSSOW: Yes; but they will not show it until later.

Mr. CALDWELL : Would it show up later in storage?

Mr. GÜSSOW: Yes, it would. We put some potatoes in an incubator for a certain time and when we cut them we found nothing wrong with them. Two weeks after we found typical Black Heart in storage.

Mr. CALDWELL: It lowers the vitality for seed, too.

Mr. GÜSSOW: Yes, of course, although they may be used for seed still.

Mr. CALDWELL: It really lowers the vitality?

Mr. GUSSOW: I doubt whether it would do that permanently, because once the potato has formed roots it grows independently of the set. I know it does not affect the yield of the potatoes.

Mr. GÜSSOW: I doubt whether it would do that permanently, because once department; the dispute was whether the potatoes were sound or not. They were sent to you and the answer came back that they were not sound. They were nice samples of medium-sized potatoes, as clean-looking as you like, but they were all that way.

Witness retired.

(The Committee adjourned.)